

CLAIMS

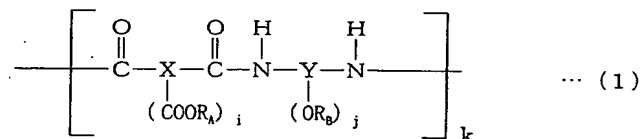
1. A negative type photosensitive resin composition which comprises:

(A) a polyamide having a structural unit represented by the following formula (1) and having a photopolymerizable unsaturated double bond: 100 parts by mass,

(B) a monomer having a photopolymerizable unsaturated double bond: 1-50 parts by mass,

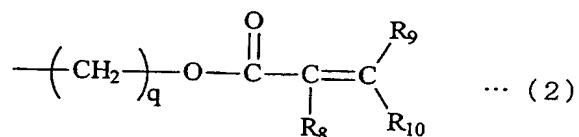
(C) a photopolymerization initiator: 1-20 parts by mass, and

(D) a melamine resin: 5-30 parts by mass,

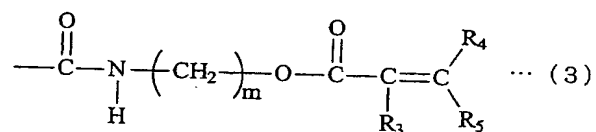


(where X is a 2-4 valent aromatic group and Y is a 2-4 valent aromatic group, i and j are integers of 0-2 and satisfy $i + j = 2$, k is an integer of 2-150, R_A is independently a monovalent organic group having a photopolymerizable unsaturated double bond and represented by the following formula (2) or a saturated aliphatic group of 1-4 carbon atoms, and R_B is independently a hydrogen atom or a monovalent organic group having a photopolymerizable unsaturated double bond and represented by the following formula (3), with the proviso that when the total mol number of R_B is assumed to be 100 mol%, not less than 10 mol% and not

more than 50 mol% thereof is the monovalent organic group having a photopolymerizable unsaturated double bond and represented by the following formula (3),

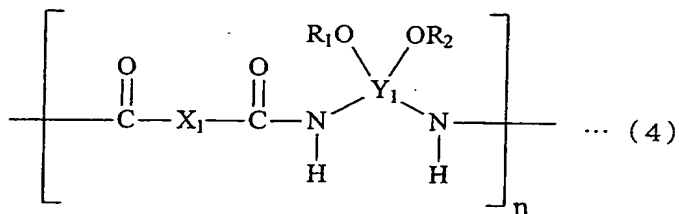


where R_8 is a hydrogen atom or an organic group of 1-3 carbon atoms, R_9 and R_{10} are independently a hydrogen atom or an organic group of 1-3 carbon atoms, and q is an integer of 2-10,

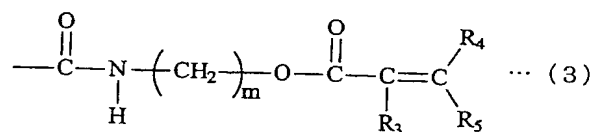


where R_3 is a hydrogen atom or an organic group of 1-3 carbon atoms, R_4 and R_5 are independently a hydrogen atom or an organic group of 1-3 carbon atoms, and m is an integer of 2-10).

2. A negative type photosensitive resin composition according to claim 1, wherein the polyamide (A) having a photopolymerizable unsaturated double bond is a polybenzoxazole precursor having a structural unit represented by the following formula (4):



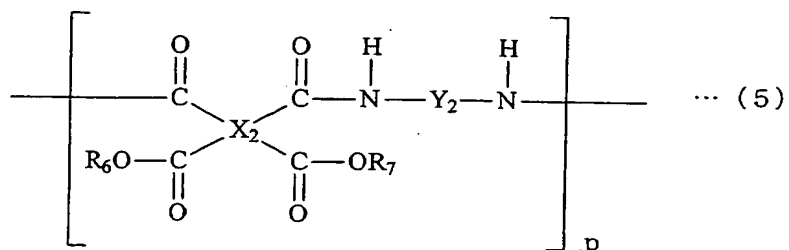
(where X_1 is a divalent aromatic group, Y_1 is a tetravalent aromatic group, n is an integer of 2-150, and R_1 and R_2 are independently a hydrogen atom or a monovalent organic group having a photopolymerizable unsaturated double bond and represented by the following formula (3), with the proviso that when the total mol of R_1 and R_2 is assumed to be 100 mol%, not less than 10 mol% and not more than 50 mol% of R_1 and R_2 are the monovalent organic groups having a photopolymerizable unsaturated double bond and represented by the following formula (3):



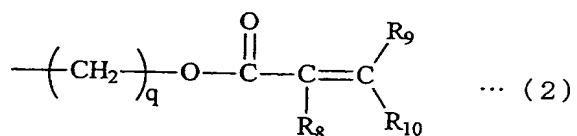
where R_3 is a hydrogen atom or an organic group of 1-3 carbon atoms, R_4 and R_5 are independently a hydrogen atom or an organic group of 1-3 carbon atoms, and m is an integer of 2-10).

3. A negative type photosensitive resin composition according to claim 1, wherein the polyamide (A) having a photopolymerizable unsaturated double bond

is a polyimide precursor having a structural unit represented by the following formula (5):



(where X_2 is a tetravalent aromatic group, and the $-\text{COOR}_6$ group and the $-\text{COOR}_7$ group, and the $-\text{CONH}-$ group adjacent thereto are in the ortho position to each other, Y_2 is a divalent aromatic group, p is an integer of 2-150, and R_6 and R_7 are independently a monovalent organic group having a photopolymerizable unsaturated double bond and represented by the following formula (2) or a saturated aliphatic group of 1-4 carbon atoms:



where R_8 is a hydrogen atom or an organic group of 1-3 carbon atoms, R_9 and R_{10} are independently a hydrogen atom or an organic group of 1-3 carbon atoms, and q is an integer of 2-10).

4. A negative type photosensitive resin composition according to any one of claims 1-3, wherein the melamine resin (D) has a polymerization degree of not less than 1.0 and not more than 2.2.

5. A negative type photosensitive resin

composition according to any one of claims 1-3, wherein the melamine resin (D) is a hexamethoxymethylated melamine.

6. A method for forming a heat resistant and chemical resistant relief pattern which comprises:

(1) coating the negative type photosensitive resin composition according to any one of claims 1-5 on a substrate,

(2) subjecting the coating to exposure by irradiating with active rays through a patterning mask,

(3) dissolving and removing the unexposed portions of the coating using a developer to form a relief pattern, and

(4) heating the coating at a temperature of not lower than 200°C to cure the coating.

7. A method for producing a semiconductor device which includes forming a relief pattern by the relief pattern forming method according to claim 6.

8. A method for producing a semiconductor device which includes using the negative type photosensitive resin composition according to any one of claims 1-5.